

INSTALLATION & CALIBRATION INSTRUCTIONS
FOR THE WYLIE MODEL WW875
LOAD INDICATOR SYSTEM



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I N D E X**WYLIE MODEL WW875 DIGITAL LOAD INDICATOR**

<u>Section</u>	<u>Contents:</u>
1	Introduction
2	How the Indicator Works
2.1	Load Sensors
2.2	Display
3	Operating Instructions
4	Routine Maintenance Procedures
4.1	Daily Checks
4.2	Weekly Checks
4.3	Steam Cleaning Precautions
4.4	Welding
4.5	Dynamometers
4.6	Display
5	Troubleshooting
6	How to Assemble the Indicator
6.1	Dynamometer
6.2	Amplifiers
6.3	Display
6.4	Electrical Wiring

7	Calibration of the Indicator
7.1	General
7.2	Crane Preparations
7.3	Preparation for Calibration
7.4	Calibration of the Indicator

WARNING
ALWAYS REMEMBER !

- A) That the crane load indicator must be correctly set up for the duty configuration in use and that wrong adjustments may cause the indicator system to read incorrectly.
- B) That the crane load indicator system is purely an aid to the operator. Responsibility for the safe operation of the crane lies with the crane operator, and the indicator equipment will not necessarily prevent crane damage due to overloading and related causes.
- C) Proper functioning of the equipment is dependent upon proper daily inspection and observance of the operating instructions referred to in this manual.
- D) The crane should be operated at all times so that crane monitoring motions occur smoothly and at a safe speed.
- E) The crane load indicator in its standard form is not suitable for use in hazardous (explosive) atmospheres.

INSTALLATION & SETTING INSTRUCTIONS

1 Introduction

The Wylie Digital Load Indicator (Model WW875) is designed as an aid to the crane operator. It eliminates guesswork by measuring and clearly indicating the load lifted by a crane. Preventing overloads reduces the risk of accidental crane damage and subsequent costly repairs. By always knowing the load, an operator can confidently operate within the crane's stability and structural limits.

A visual and audible warning is also given if the load lifted exceeds the preset warning limit. The indicator consists of two basic elements:

- A) A load sensor, which measures the tension in the hoist ropes.
- B) A display unit in the cab, showing the load on the hook and giving warning signals should the limit be exceeded.

These two elements are linked by an electrical cable and require a 12 or 24 VDC supply.

2 How the Indicator Works

2.1 Load Sensors (see dynamometer drawings)

Dynamometer

The dynamometer load sensor is generally mounted at the upper end of the

base section on telescopic cranes or near the tip of the boom for lattice boom cranes. For installation details see Appendix.

The hoist rope passes through the dynamometer sheaves and is deflected over a sensor sheave. This sheave is supported by an electronic load cell. The signal from the load cell is proportional to rope tension and is fed via a line amplifier to the display.

Dead-end Load Cell

For cranes rigged with multi-part lines, a dead-end load cell can be installed between the hoist rope dead-end and the dead-end anchor at the boom or jib tip. The signal from the dead-end load cell is proportional to rope tension and is fed via a line amplifier to the display.

3

A dead-end load cell cannot be used with a single part whip line or odd parts of multi-part rigging. It is also a poor choice for a telescopic crane, because the load signal must pass through a special cable reel to get to the display.

2.2 Display (See Figure 1)

The display unit contains all the electrical circuits required to regulate the supply voltage and process the dynamometer signals. Display panel push buttons are provided to test all electronic functions of the system and to set parts-of-line, alarm level and tare.

3 **Operating Instructions**

Before using the indicator, crane operators should read the introductory section of this handbook to gain a general understanding of the method of operation.

The display unit indicates the total load lifted, including the hook block. For most accurate indication, the display should be read with load stationary. You will notice that while the load is being lifted, a higher reading will result. Also while lowering, a lower reading will result. This is due to friction in the hoist system and acceleration forces.

The display has a settable load limit warning system that can be used on a specific lift to warn the crane operator if the load is heavier than it is supposed to be.

A) Turning on the Display

- 1) The display is normally wired directly to the crane key switch and comes on any time the crane is in use.
- 2) Every time the indicator is powered up, the display will show

“88.8.800” for five seconds, all six lights will illuminate and the alarm buzzer will sound to test all circuits and functions.

B) Set Parts-of-Line

- 1) After the five second start up sequence, the display will show a flashing “P1” or “P2” (PARTS OF LINE) dependent on whether main winch or auxiliary winch has been selected. This is indicated by the status of the two lamps identified “MAIN” or “AUX”. If main is selected, “P1” flashes and if auxiliary is selected “P2” flashes. If both are selected such as in “Grabbing” type applications, “P1” will flash. If the winch selection needs to change, this can only be done in normal operation mode so proceed until this is reached.
- 2) If the displayed number equals the parts-of-line reeved on the selected winch, push HOIST/ACCEPT. If both winches are selected “P2” will now flash.

4

- 3) To change the parts-of-line, use the UP/DOWN buttons and then push HOIST/ACCEPT. As before if both winches are selected “P2” will now flash. Again use UP/DOWN button to set.

C) Set Load Limit

- 1) After accepting PARTS, the LIMIT light will begin flashing and the the load limit weight will be displayed for the selected winch or winches.
- 2) If the displayed LIMIT weight is okay, push HOIST/ACCEPT.
- 3) To change the LIMIT setting, use the UP/DOWN buttons and push HOIST/ACCEPT.

D) Normal Operations

- 1) After initial acceptance of PARTS and LIMIT, the display will show load weight continuously.
- 2) The selected winch can be changed at any time by pushing the HOIST/ACCEPT button. If this is done you will be prompted by the flashing “P1” or “P2” to verify and change, if necessary, parts-of-line setting.
- 3) LIMIT SET and PARTS can be changed at any time by:
 - Pushing LIMIT SET or PARTS OF LINE
 - Using UP/DOWN button
 - Pushing HOIST/ACCEPT
- 4) To check if the indicator is operational, simultaneously push the

UP/DOWN buttons. The LIMIT warning lamp illuminates, and the audible warning sounds to signify that all functions are okay.

4 Routine Maintenance Procedures

4.1 Daily Checks

- Ensure that the parts-of-line setting is the actual number of parts-of-line in use and the indicated winch is the one in use.
- Push the UP/DOWN buttons simultaneously to test the system and note that the LIMIT WARNING light illuminates and that the audible alarm sounds.
- Note that the indicated hook block weight has not changed significantly from the previous day. If there has been a big change, check the system calibration by lifting a known weight, and recalibrate if necessary.

5

4.2 Weekly Checks

- Check all plug and socket connections for security or damage.
 - Check the load link/pins for security, particularly the split pins and washers. Check the plug and socket connections for security or damage.
 - For cranes fitted with a dynamometer load sensor, check that the hoist rope runs smoothly through the dynamometer and ensure the sheaves (rollers) rotate during load hoisting or lowering.
 - At regular intervals (once or twice each month) lubricate the sheave bearings using Shell Alvania No. 2 grease.
 - Clean out any clogged grease or dirt, especially adjacent to the center sheave assembly and load cell.
- 4.2.2 If the display facia should become dirty, it may be cleaned by using a non-abrasive cloth dampened with any household counter top cleaner. Be careful not to exert too much pressure in the display window.
- 4.2.3 Inspect all wiring, particularly wiring external to the cab, and check that there are no loose connections. Check any in-line connection on the boom for damage and security. Check tightness and bonding on cable glands.
- 4.2.4 Check the optional cable storage drum and cable up the boom (lattice boom cranes). Check that the cable is properly attached and undamaged.
- 4.2.5 Set the parts-of-line to the number of lines in use. Select the appropriate winch. Lift a known load a few feet and stop. Check that the meter indicates correctly. Include hook block weight.

4.2.6 Set the alarm limit to a lower value than the load being lifted and check that the LIMIT warning lamp illuminates and that the audible warning sounds.

4.3 Steam Cleaning Precautions

Care should be taken when steam cleaning the crane so that none of the enclosure seals are damaged, allowing moisture into the electronics.

4.4 Welding

The WW875 should be isolated from both terminals of the crane battery before any welding is carried out on the crane.

6

4.5 Dynamometer (Models 4 & 5)

Clean out any clogged grease and dirt, especially adjacent to the center roller, "U" shaped assembly and load cell. During the normal crane overhaul, the rollers should be removed from the dynamometer, the bearings cleaned and repacked with Shell Alvania No. 2 grease.

4.6 Display

The display is fitted with two circuit boards which may be replaced as a pair. Complete recalibration of the indicator is necessary if the boards are replaced.

After any repairs to any part of the indicator, it should be checked for performance by load testing.

Ensure that Fuse 1 is a ½ amp max fuse.

5 **Troubleshooting**

Before contacting the manufacturer, check the following:

- A) Parts-of-line is set to the correct number of parts.
- B) The correct winch is selected.
- C) The exact weight of any load lifted is accurately known.
(Include the hook block weight and slings.)

In all communications please quote the unit serial number of the equipment.

6 **How to Assemble the Indicator**

6.1 Dynamometer

Typical installation drawings are included in the Appendix, but a special drawing may be supplied particular to the application.

After installing the dynamometer, check that the hoist rope is always in contact with the sheaves at each end of the dynamometer over the full range of boom angle, boom extension and drum fleet angle. If it is not, refer to installation drawing and reposition.

7

6.2 Amplifier

The amplifier supplied with Model 4 and Model 5 dynamometers can be attached to the side of the dynamometer, or can be located in a secure position near the dynamometer.

6.3 Display

The display should be located at the front of the cab, where it is readily visible from the operator's control position. Take care not to obscure any displays, control levers, switches, etc.

6.4 Electrical Wiring

See Wiring Diagram DW0514-3. For most installation the three-conductor shielded interconnecting cable supplied with the system will have a four-pin rubber connector which will mate with the standard connector at the display. Route the other end of the cable from the display to the amplifier.

Connect the four-conductor load cell cable and the three-conductor interconnecting cable to the terminal strip inside of the amplifier box. After replacing the amplifier cover, be sure that the four cover screws are fully tightened. (These are self-tapping screws and will sometimes feel tight before the cover is pulled down against its gasket.)

It is desirable to connect power for the indicator from a part of the crane's electrical circuit that is functional only when either the engine is running, or when a key switch, battery isolator, etc. is on. This will prevent the batteries from being run down by the indicator when the crane is not in use.

7 **Calibration of the Indicator**

7.1 General

No special test equipment is required for calibration. Three test loads are recommended to verify mid-range accuracy of the system.

8

Test Load 1:

A large load that produces a line pull of between 85% and 95% of the crane's maximum allowable line pull. Calculate test load size below.

Maximum single part hoist line pull _____

Parts-of-line to be calibrated X _____

X 0.90

Test Load No. 1 _____

Check to be sure that Test Load No. 1 does not exceed the crane's capacity at the test load radius.

Test Load 2:

A small load that is approximately 10% of Test Load No. 1. Calculate test load size below.

Test Load No. 1 _____

X 0.10

Test Load No. 2 _____

Test Load 3:

An intermediate load that is approximately 50% of Test Load No. 1.

Test Load No. 1

X 0.50

Test Load No. 3

The exact percentages are not critical, but the test load weights must be accurately known to within $\pm 1\%$.

Example: A machine lifting on four parts-of-line with a maximum single part line pull of 10,000 lbs may be calibrated using test loads within the ranges of 34,000 – 38,000 lbs, 3,400 – 3,800 lbs and 17,000 – 19,000 lbs respectively. Calibration with a single part would require test loads of 4,250 – 4,750 lbs respectively.

9

The weight of the block, sling(s) and other lifting tackle must be known and included as part of the test load. The indicator system is designed to indicate total rope load. For best accuracy, calibrate the system using the maximum parts of the line with which the crane will normally be operated.

Do not exceed the crane manufacturer's rated loads.

7.1.1 Accuracy and Compliance with SAE April 85

Where compliance with SAE J376 SPR 85 Load Indicating Devices in Lifting Crane Service is required, calibration of the load indicator must be such that the indicated load is not less than the actual load (100%), nor more than 10% above the actual load (110%).

It may be necessary when calibrating to, in some cases, adjust high in order to achieve (i.e. not less than 100%).

7.2 Crane Preparation

Position the crane level on firm ground. Set tires to correct pressure. Where applicable, extend outriggers.

Grease all hoist system sheaves and check for free rotation. Remove any hardened grease from sheaves.

7.3 Preparation for Calibration

The WW875 Display has internal switch settings that allow it to work with a variety of load sensor configurations. These switches are normally factory set to match the sensors supplied with the system. If the sensors are changed or an amplifier is added or deleted, then the switch settings must be changed, refer to Section 8 of this manual.

Select the winch to be calibrated before starting calibration. Also set parts-of-line.

7.4 Calibration of the Indicator

All of the calibration adjustments are made using the pushbuttons on the face of the display. The general procedure is:

- Use UP/DOWN pushbuttons to select calibration function.
- Push HOIST/ACCEPT to enter selected calibration function.

10

- Use UP/DOWN pushbuttons to increase or decrease the number displayed. It is useful to experiment with the UP/DOWN numbers setting routine to get a feel for the way that the numbers change. At first, numbers change slowly for fine adjustment. For course adjustments, hold a button down until the numbers begin to change very rapidly.
- Push HOIST/ACCEPT to save the number selected.
- Use UP/DOWN pushbuttons to select next calibration function.

A) Enter Calibration Mode

- Turn off or disconnect power to the display
- Using three fingers, simultaneously press down and hold HOIST/ACCEPT, LIMIT SET and PARTS OF LINE buttons
- Reconnect power to the display
- Release the three buttons
- The display will show "CAL-" for three seconds and then the operating system software version number for a further three seconds
- This will be followed by "88.8.800" for five seconds and then show "SEL.U" (SELECT UNITS).

Note: LIMIT and TARE LED's will flash continuously while in calibration mode.

B) Select Units

- Press HOIST/ACCEPT. Display will show "UNIT".
- If a change of display units is required, press

HOIST/ACCEPT.

- Press UP/DOWN buttons until a light is on next to the units of measure selected for calibration. (TONS, TONNES, POUNDS or KILOGRAMS).
- Press HOIST/ACCEPT. Display will show “ACPt”, sound the buzzer and return to “SEL U”.

11

C) Select Indicator Range

- Press UP. The display will show “SL.P1” (SELECT PULL 2) if auxiliary winch is selected.

If the winch selection is not correct press “LIMIT” button to return to normal mode and select correct one. Note that if both winches are selected the display will show “ERR” and return to normal mode automatically.

- Press HOIST/ACCEPT. A number will show on the display.
- Press UP/DOWN buttons until displayed number is equal to the line pull of the maximum single part hoist line pull on the selected winch.
- Press HOIST/ACCEPT. Display will show “ACPt”, sound the buzzer and return to “SL.P1” or “SL.P2”.

D) Calibrate Test Load No. 2

- Press UP. The display will show “CAL L” (CALIBRATE LOW).
- Press ACCEPT. A number will show on the display

Note: The display numbers will flicker and fluctuate more than when the unit is in normal operating mode.

- Lay the crane hook block on the ground if possible.
- Press UP/DOWN until the display reads as close to zero as possible.
- Attach the hook to Test Load No. 2 (small load, see Section 7.1).
- Lift the small load slowly and stop gently.

- Press UP/DOWN until the display correctly reads the weight of the test load, including the hook block and slings. Repeat Steps 6 and 7 several times to ensure accuracy.
- Press ACCEPT when load setting is correct. Display will show “ACPT” and return to “CAL L”.
- Lower Load to the ground

E) Calibrate Test Load No. 1

- Press UP to display “CAL H” (CALIBRATE HIGH).
- Press ACCEPT. A number will show on the display.
- Attach the hook to Test Load No. 1 (large load, see Section 7.1).

12

- Lift the test load slowly and stop gently.
- Press UP/DOWN until the display correctly reads the weight of the test load, including the hook block and slings.
- Repeat Steps 4 and 5 several times to insure accuracy. Press ACCEPT when load setting is correct. Display will show “ACPT” and return to “CAL H”.
- Lower load to the ground.

F) Recheck Load Calibration

- Lift Test Load No. 2 and recalibrate if necessary.
- Lift Test Load No. 1 and recalibrate if necessary.
- Lower load to the ground.

G) Exit Calibration Mode

- Press LIMIT SET to exit.

H) Set Load Limit

- Press LIMIT SET. LIMIT light will flash.
- Use UP/DOWN buttons to set the displayed number equal to the test load.
- Press HOIST/ACCEPT.

I) Test Load Limit Alarm

- Lift the test load.
- Check to see that the red LIMIT light and buzzer come on.

- Lower the load. The LIMIT alarms will stay on until the actual load is 5% below the load LIMIT.
- Reset load LIMIT for the next load to be lifted.
- Calibration is complete.